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MEDICARE BONUS PAYMENTS TO PHYSICIANS IN HEALTH MANPOWER SHORTAGE AREAS

Final Report

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Submitted by:
(in alphabetical order)

Jonathan Bogen, M.S.
Stephen Davidson, Ph.D.

The Center For Health Economics Research

Frank Porell, Ph.D.

Bigel Institute For Health Policy
Brandeis University

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1.0 INTRODUCTION: THE PROBLEM

In order to increase access to services for Medicare eligibles in areas with a shortage of physicians, Congress adopted a policy of paying a five percent bonus to physicians providing services in those areas. The five percent bonus applies to physicians serving patients in rural shortage areas beginning in January 1989. A similar bonus would apply to urban shortage areas two years later. A report to the Congress regarding the urban shortage areas is due on January 1, 1990.

This project has two principal objectives: one is to determine whether shortage area definitions as developed by the PHS are an appropriate tool for the Medicare incentive payment program, and secondly, to provide HCFA with guidance as to the implications of bonus payments to physicians who practice in urban shortage areas. This report advises HCFA on the proposed policy of paying bonuses to physicians in urban areas as well as evaluating the current policy of paying bonuses to physicians in rural shortage areas.

1.1 The Approach

The bonus payment policy rests on several assumptions, and in this report we will examine each of the following assumptions:

1. Medicare eligibles who are residents of shortage areas have inadequate access to care;
2. That inadequate access is attributable to having too few physicians practicing in the area;
3. Physicians will be attracted to provide care in shortage areas by higher fees;
4. Physicians who otherwise would leave the shortage areas will be induced to stay by a five percent bonus;
5. The inevitable side-effects of the policy will not be too large to undermine the accomplishments. These include the cost of the policy, the ease of implementation, and any large windfalls to physicians who already practice in the areas.
6. It is the least expensive, easiest to implement policy that would accomplish the goal reliably.

This report is organized primarily around these questions, each of which is taken up in logical sequence in Chapter two (assumptions 1 and 2), Chapter three (assumptions 3 and 4), and Chapter four (assumptions 5 and 6). Before doing that, however, some background must be provided regarding the origin of the policy, the designation of Health Manpower Shortage Areas (HMSAs), and HCFA's plans for implementing the five percent Medicare bonus in rural shortage areas beginning in January 1989.

1.2 Adoption of the Policy

The idea for the policy of paying a bonus equal to five percent of Part B Medicare payments to physicians treating Medicare eligibles in Health Manpower Shortage Areas (HMSAs) developed in response to an issue raised by a Congressman. Representative Jim Slattery, a member of the House Energy and Commerce Committee from a rural district in Kansas (which includes Lawrence, Manhattan, and Topeka), believed that Part B allowed charges paid to physicians in his district were lower than those paid to physicians elsewhere, and he worried that his constituents would have less access to medical services than they needed. He was concerned that some physicians already practicing there would not be able to remain, thus reducing access still further. In addition, he feared access could not be increased because other physicians would be unable to make the financial commitment to enter the area. He asked Committee staff what tools or concepts that could be implemented easily were available to correct the situation.

The solution that emerged from discussions with other Committee members and staff focused on the Health Manpower Shortage Areas (HMSAs), designated by the Public Health Service since 1978. The primary purpose was to identify places with insufficient physicians and other caregivers to which National Health Service Corps personnel could be sent. HMSAs are updated annually so the feasibility criterion would be met; and since they have already been used for other purposes, as well, it seemed reasonable that they could be adapted to accomplish this goal, too. The question remained as to what policy would do the job.

Committee members and staff knew the evidence showing that physicians responded to financial incentives. For example, it had been shown that physicians would be more likely to treat Medicaid patients when the fees were higher than when they were lower and that, in some cases, when the fees were too low, they would withdraw from the program altogether (Davidson, 1982). With this knowledge, it was not unreasonable to seize on the idea of paying physicians a bonus to provide services to Medicare eligibles in areas with a shortage of physicians, like parts of Congressman Slattery's district had been. With these extra payments, some physicians might be induced to remain in the district instead of leaving while others might be encouraged to establish at least a part-time office to serve elderly residents of the area. While the Committee members recognize that five percent of Medicare billings may be a small amount and, therefore, not much of an incentive, they believe that adopting the principle was significant even if it turned out that the policy did not result in dramatic increases in access to services.

Having adopted the HMSA as a centerpiece of the policy to increase access to services, the Committee recognized that some HMSAs can be found in urban areas. Therefore, in the interest of equity, it was proposed that the same policy be applied in urban shortage areas in the hope of easing the presumed access problem for the urban elderly. It quickly became obvious, however, that special characteristics of urban areas -- particularly their denser population and shorter distances -- created implementation issues that did not apply in rural HMSAs. For example, in a city or metropolitan area that met the criteria for designation as a primary care shortage area, appropriate personnel might be accessible in a hospital clinic or at distances which, though relatively far for an elderly patient, might be easier for a more mobile physician. Because of these characteristics, policies that would be appropriate in rural areas should not be implemented without modifications in urban HMSAs. Otherwise, the unintended result might be to provide an unnecessary windfall to physicians for practicing part-time in an area that was close to their main practice. The Congress, therefore, asked HCFA to

study the issues related to implementing the bonus policy in urban HMSAs and to submit a report by January 1, 1990. The effective date for paying the bonuses in urban HMSAs, therefore, was delayed until January 1, 1991.

1.3 Designation of Health Manpower Shortage Areas

1.3.1 Development of Health Manpower Shortage Areas

The concept that some areas of the country suffer from a shortage of physicians was debated for many years. With creation of the National Health Service Corps (NHSC) in 1970, it became necessary to define a methodology using available data that would identify those areas of the country with shortages of health personnel. Under terms of the Emergency Health Personnel Act (P.L. 91-623), the NHSC was created to provide physicians, dentists, and other allied health professionals to areas with critical shortages. Working criteria for "shortage areas" based upon the ratio of physicians to the population were not defined until passage of the 1972 amendments to the Public Health Service Act (P.L. 92-585). The original guidelines outlining a methodology for shortage areas were later amended in the Health Professions Educational Assistance Act of 1976 (Section 332, P.L.94-484) to include in the criteria other factors in addition to the physician-population ratio. A comprehensive list of health manpower shortage areas was first published in the Federal Register of July 17, 1978 (43 FR 30648). The rules for designation of HMSAs were finalized on November 17, 1980. The Office of Shortage Analysis within the Bureau of Health Care Delivery and Assistance (BCHDA), part of the Public Health Service (PHS), is empowered to designate or de-designate HMSAs.* As of September 30, 1988 1,925 HMSA were designated, of which 33 percent were in metropolitan areas and 67 percent in non-Metropolitan areas (Office of Shortage Analysis, 1988).

*Prior to October 1988, the Office of Shortage Analysis was part of the Bureau of Health Professions (BHPr).

There are three types of HMSA designations: geographic (county or subcounty), special population (e.g., racial group), and facility (e.g., local prison). Of the three types of designations, only geographic HMSAs will be eligible for the physician incentive payment. According to the Office of Shortage Analysis (1988), 1,586 of the 1,925 HMSAs in 1988 are geographic HMSAs (235 HMSAs are population groups and 104 are facility based). Geographic HMSAs have the following requirements:

(1) The area must be "a rational area for the delivery of primary care services,"; this could include a whole county, part of a county, or an area larger than a county. If the HMSA is part of a county, it must be identified by towns, townships, minor civil divisions, census county divisions, enumeration districts, magisterial districts or other divisions as recognized by the Bureau of Census.

(2) One of the following conditions must be met:
   a. the ratio of the population to full-time primary care physicians is at least 3,500 to one physician.
   b. The population to physician ratio is less than 3500:1 but greater than 3000:1, and the area has unusually high needs for primary care services or insufficient capacity of existing primary care providers.

(3) "Primary care manpower in contiguous areas are overutilized, excessively distant, or inaccessible to the population of the area under consideration." For contiguous areas to be considered overutilized they must be more than 30 minutes travel time from the HMSA. The distance and accessibility criteria are clearly spelled out in detail in the Federal Register (November 17, 1980).

In addition HMSAs are distinguished by another feature, the degree of shortage, determined by a combination of the ratio and the presence or absence of "unusually high needs indicators" (see Table 1-1). An area is considered to have high primary care needs if it has a high birth rate, a high mortality rate, or more than 20 percent of the population with incomes below the poverty level. The BHCDA categorizes HMSAs into four classes based upon the degree of shortage and the presence or absence of the high needs indicators. Thus, in areas with none of the high needs indicators, the ratio of population to physicians must be in excess of 5000 to one in order to be classified as a class one or two shortage area. In areas of high needs, the ratio must be greater than 4000 to one physician. The majority of geographic HMSAs are

TABLE 1-1

DEGREE OF SHORTAGE OF HEALTH MANPOWER SHORTAGE AREAS (HMSA)

	High Needs Not Indicated	High Needs Indicated
Class 1	No physicians	No physicians or Ratio ≥ 5,000
Class 2	Ratio ≥ 5,000	5,000 > Ratio ≥ 4,000
Class 3	5,000 > Ratio ≥ 4,000	4,000 > Ratio ≥ 3,500
Class 4	4,000 > Ratio ≥ 3,500	3,500 > Ratio ≥ 3,000

Note: Ratio represents the population per physician.

Source: Adapted from the Federal Register, Vol. 45, No. 223, November 17, 1980.

either class one or two, comprising 61 percent of the rural HMSAs and 71 percent of the urban HMSAs based upon the most recently available data (Table 1-2).

According to BHPr (1980), the ratio of 3500 to one was chosen as the cutoff for HMSA designation because it represented the lowest quartile of the distribution of ratios (as determined from 1974 Bureau of Census estimates of the population and data on the number of non-federal primary care physicians). This value was reduced to 3000 to one in the presence of unusually high needs for primary care services. The HMSA criteria have remained the same since their publication in the 1980 Federal Register.

The HMSA list, published annually in the Federal Register, forms the basis for "opportunity lists" used by the National Health Service Corps in prioritizing the placement of NHSC physicians and other federal health care workers (e.g., nurses, etc.). At the present time, the NHSC scholarship program has been all but eliminated with the exception of approximately 100 physicians who have recently completed or are in the process of completing their residency training. Additionally, under terms of other loan programs, medical students may elect to become NHSC physicians with a requirement of at least two years of NHSC service in order to waive some loan indemnity. Even though the NHSC is being phased out, the designation of HMSAs will continue as before into 1989, providing the basis for development of geographic areas that are eligible for the Medicare incentive payment.

1.3.2 HMSA Designation and Withdrawal

The process used by BHCDA to determine shortage areas occurs in two steps. Initially, the BHCDA uses county level data to compute physician to population ratios. Secondarily, for areas not meeting the ratio on a county level, BHCDA attempts to determine if sub-areas (e.g., towns or census tracts) or population groups might be considered shortage areas based on the ratio. Population estimates at the county level are obtained using the latest available county-level data, but for the sub-county level (e.g., population

TABLE 1-2

NUMBER OF PRIMARY CARE GEOGRAPHIC HMSAs AS OF OCTOBER 1, 1988

Class	Within MSA		Non-MSA	
1	181	40.8%	407	35.3%
2	132	30.0	293	25.4
3	68	15.3	212	18.4
4	62	14.0	241	20.9
All HMSAs/Class 1-4	443		1,153	

Source: Obtained from Richard Lee, Shortage Analysis Branch, Bureau of Health Care Delivery and Assistance, U.S. Public Health Service.

groups or poverty levels in urban areas), projections based on 1980 census data are used. For estimates of the number of physicians by county, BHCDA uses the American Medical Association annual data base of physicians, the annual American Osteopathic Association data, and AHA survey data on the number of hospital-based providers. The primary care physician to population ratio is based only upon the following specialties: internal medicine, pediatrics, general and family practice, and obstetrics. BHCDA stipulates that a 40 hour week be used as the basis for computing full-time equivalency for physicians practicing less than full-time. Generally, most of the data needed to determine the designation of a HMSA within an MSA (i.e., for a city or neighborhood) will need to be obtained from an agency at the state or city level. The population estimates were originally adjusted by age-sex direct standardization.*

In addition, organizations, can request HMSA designation for particular "defined geographic areas" if the county in which the area is located was not originally designated a shortage area by the ratio alone. The requests for designation can come from the local medical society, Health Systems Agency (HSA), community organization or even from an NHSC physician. All requests must be supported by suitable documentation as to the population, number of full-time equivalent physicians, and the presence of high needs indicators. An organization can request that part of a city be designated as a shortage area by supplying appropriate data on both the population and the number of physicians, but BHCDA can only verify the supplied documentation to a limited extent using the available data sources which have been previously discussed. HMSA ratios are checked annually using latest available data (which may be as old as the last census). Every year, data and the proposed lists are sent for verification to medical societies, local health departments, and Health System

*According to the published criteria, the population estimates within the service area are adjusted according to 12 age-sex categories of visit rates determined from the 1975 Health Interview Survey. A population with a high proportion of elderly will be adjusted up to account for higher visit rates. These adjustments for age-sex distribution were not generally performed by BHCDA after 1983, however, according to Richard Lee, Director of the Shortage Analysis Office.

Agencies or State Health Planning and Development Agencies (SHPDA) for HMSAs that are up to three years old. If a reply is not received in the specified period or if the reporting agency cannot verify the information, then the designation is withdrawn the following year.

1.3.3 Stability, Identification and Verification of HMSAs

A change in the number of individual HMSAs over the course of time can depend on the following factors: 1) an area was actually added or is no longer a shortage area, 2) the HMSA is not more than t[illegible]s old so no effort was made to remove unverified shortage areas from [illegible], and 3) no real effort was made by the validating agency to verify whether the area in question was still a shortage areas. A comparison of HMSAs from 1983 to 1988 was performed, and it was found that remarkably little overall change occurred in the number of HMSAs in each state with the exception of the period from 1983 to 1984 and from 1987 to 1988 as compared to other years. (see Table 1-3). The significant decrease from 1983 to 1984 reflects the fact that a large number of areas that were three years old were withdrawn from the list because updated data was not received to verify the HMSA designation.

We attempted to determine for urban HMSAs (i.e., part of a county or counties lie within MSAs) for four states (i.e., California, Connecticut, Massachusetts, and New Jersey) the amount of change in the number of designated HMSAs from year to year. We choose these four states because they had a large number of urban HMSAs in relation to non-urban HMSAs. Our data source was the list of designated HMSAs and withdrawn HMS[illegible]shed annually in the Federal Register (Vol. 48, August 1, 1983 and vol. [illegible], September 20, 1985). We studied HMSAs from 1983 through 1985 for two reasons: 1) according to Table 1-3, the change in the number of HMSAs was greatest in the period 1983 to 1984; and 2) a detailed list of HMSAs was not published in 1984. We evaluated the following changes between 1983 and 1985: 1) additions or withdrawals in HMSAs; and 2) whether the degree of shortage changed from a class 1 or 2 to a 3 or 4 or vice-versa during this period. HMSAs with degree

TABLE 1-3

GEOGRAPHIC PRIMARY CARE HMSAs (MSA & NON-MSA)

State	NUMBER OF GEOGRAPHIC HEALTH MANPOWER SHORTAGE AREAS					
	1988	1987	1986	1985	1984	1983
Alabama	40	46	47	48	57	69
Alaska	9	9	10	10	10	17
Arizona	23	23	22	20	21	25
Arkansas	42	45	46	46	45	44
California	71	73	79	77	79	103
Colorado	21	25	26	25	24	35
Connecticut	4	4	4	4	4	17
D.C.	1	1	1	1	2	2
Delaware	3	3	3	3	3	3
Florida	35	34	35	32	31	36
Georgia	68	71	72	73	76	76
Hawaii	1	1	1	1	1	2
Idaho	28	25	24	22	21	19
Illinois	46	46	44	43	51	58
Indiana	30	31	30	29	30	34
Iowa	21	20	20	21	30	34
Kansas	14	14	15	16	24	24
Kentucky	46	45	45	47	42	67
Louisiana	42	46	45	44	44	41
Maine	23	25	25	23	22	20
Maryland	12	13	17	17	16	22
Massachusetts	18	18	18	17	17	35
Michigan	44	45	45	46	43	52
Minnesota	24	24	24	27	24	30
Mississippi	47	43	52	51	51	61
Missouri	46	56	57	52	50	51
Montana	28	28	27	27	22	25
N.Carolina	41	48	50	46	45	56
N.Dakota	28	27	25	25	26	30
Nebraska	20	23	20	18	23	25
Nevada	17	17	19	20	17	35
New Hampshire	3	5	5	5	5	5
New Jersey	8	8	10	9	9	15
New Mexico	26	28	28	27	26	19
New York	61	62	60	61	60	93
Ohio	42	45	48	50	45	55
Oklahoma	17	16	21	20	17	39
Oregon	37	39	39	39	37	27
Pennsylvania	61	62	64	73	72	82
Puerto Rico	36	36	23	23	23	15
Rhode Island	3	3	3	3	2	5
S.Carolina	39	37	39	37	35	34
S.Dakota	37	37	35	32	31	41
Tennessee	56	55	43	42	41	45
Texas	93	84	83	80	73	93
U.S. Territories	9	9	8	8	7	7
Utah	16	17	17	17	18	17
Vermont	7	7	8	11	11	11
Virgin Island	2	2	2	2	2	2
Virginia	36	43	45	43	45	56
W.Virginia	41	48	49	49	49	52
Washington	16	15	15	14	16	28
Wisconsin	33	35	36	36	33	45
Wyoming	14	13	12	16	14	15
TOTAL	1586	1635	1641	1628	1622	1949

Source: Adapted from Quarterly Health Manpower Shortage Area Statistics BHCDA, U.S. Public Health Service.

changes downwards (i.e., less severe a shortage, change to a class 3 or a 4) would no longer be eligible for the bonus payment, whereas conversely HMSAs with degree changes upwards (i.e., change to a 1 or a 2) would then be eligible for the bonus payment. The biggest change during this period for all four states were that withdrawals far outnumbered new designations (see Table 1-4) and of those that continued their designation, all states had at least one HMSA with a significant degree change (e.g., in New Jersey, one-third of the remaining 1985 HMSAs had a significant degree change). This analysis seems to suggest that in urban areas at least, physicians who are eligible one year for the bonus (in the shortage area) may not remain eligible the next year due to changes in both area designation and the degree of that designation.

The validity of the data, and the process used to designate HMSAs in general is subject to question. Potential data problems arise in verifying the ratio in a service area that is part of a county or that crosses county borders. This is still more of an issue in urban service areas when census tracts or even neighborhoods are used. Further, calculation of the ratio may depend somewhat arbitrarily on which areas requested designation and supplied the relevant documentation. Thus, some areas may be excluded because they were not considered to be part of this "service area" by the requesting agency. The census data used for computation of the annual ratios for subcounty HMSAs is updated every ten years. With the length of time since the last census, the accuracy of the physician to population calculations will undoubtedly suffer.

The annual verification process for previously designated HMSAs will continue to depend on medical societies and local health departments, since HSAs or SHPDAs have been virtually eliminated in most states. Medical societies have a different incentive from health departments or planning agencies to insure continuation of all designated HMSAs since financial implications of the bonus program are different than those under the original NHSC policy.

TABLE 1-4

SELECTED URBAN GEOGRAPHIC HMSAs BY YEAR AND STATE

State	1983 HMSAs	1984-1985 New Designations	1984-1985 Withdrawal Designations	1984-1985 Degree Changes	1985 HMSAs
California	70	10	38	8	42
Connecticut	16	0	12	1	4
Massachusetts	34	3	19	5	18
New Jersey	15	1	8	3	9

Note: The actual number of geographic, primary care HMSAs in 1985 may not equal the difference in added or dropped HMSAs if only part of a HMSA was withdrawn or added in 1984 or 1985.

2.0 ACCESS AND THE DISTRIBUTION OF PHYSICIANS

Implicitly, the policy of paying bonuses of five percent to physicians providing services to Medicare eligibles in HMSAs rests on several logical assumptions. These assumptions were identified in Section 1.1. In the next three Chapters, we examine each in turn. In some cases, suggestions are made for empirical tests of the assumptions which are beyond the resources of the current project. In doing so, our intent is to present the choices unconstrained by practical considerations as a step toward the selection of analyses.

2.1 Access

Assumption No. 1: Medicare eligibles who are residents of shortage areas have inadequate access to care

Assumption No. 2: Inadequate access is attributable to having too few physicians practicing in the area.

Review of the relevant literature calls into question the simple supposition that the ratio of physicians to the general population represents a valid measure of the degree of access to care (which is the underlying basis for increasing the payment to physicians practicing in rural shortage areas) (Hemenway, 1982; Kleinman and Wilson, 1977; Aday, 1976). Though the ratios can be strongly related to the rate of utilization, alone they are not a perfect indicator of the quantity of medical services used (Pasley et al., 1987). Medical Underservice Areas (MUAs) are another measure used by the Federal Government in designating service areas for funding the Community Health Services Programs. A service area is classified as an MUA depending on the index score derived from four factors: the physician to population ratio, percent of population over 65, percent of population below the poverty level, and infant mortality rate.* MUAs differ from HMSAs in that the four factors

*The Index of Medical Underservice developed at the University of Wisconsin in 1973 was used in designating medically underserved areas for the Federal HMO program (Health Services Research Group, 1975).

are weighted in the index according to expert consensus including the proportion of elderly in the service area. Kleinman and Wilson (1977) studied MUAs based upon data from the 1973/1974 Health Interview Survey and concluded that the rates of physician visits were not significantly different between people living in rural MUAs and ASAs (Adequately Served Areas), although the rate of medical hospitalization was somewhat greater in MUAs. On other measures of access, such as use of selected preventive measures, the differences in MUAs and ASAs were not as great as that between urban and rural areas alone. In fact one might legitimately speculate that Medicare beneficiaries living in rural areas may have reduced access because fewer physicians practice in rural areas and the elderly who need more services than non-elderly adults, constitute a higher proportion of the population in rural areas.*

A number of studies lend support to the idea that access is reduced in rural areas as a direct result of physician shortages, but these studies are based on the population generally, not on Medicare beneficiaries in particular. AMA Survey data (Roback et al., 1987) underscores the maldistribution of physicians; for example, nine out of ten office based physicians were located in metropolitan areas and the difference is even higher for hospital-based physicians. This data does not support the theory that a greater supply of physicians would result in a diffusion of physicians to non-metropolitan areas. For example, analysis of the growth in the number of physicians, show that the largest growth occurred in metropolitan areas. From 1970 to 1986, the number of office-based practices increased by 78.4 percent in metropolitan areas as compared to an increase of only 44.3 percent in non-metropolitan areas. For hospital-based practices, the number of practices grew by 81.2 percent in metropolitan areas between 1970 and 1986 and by 62.9 percent in non-metropolitan areas. According to Sheps and Bachar (1981) the uneven distribution of physicians in rural areas compared to urban areas results in inequity in access and a disparity in

*According to the 1980 Census, the percent of the population over 65 was 10.7 within metropolitan statistical areas and 13.0 percent in non-metropolitan areas (State and Metropolitan Area Data Book, 1986).

services. For example, in 1975 metropolitan residents reported 5.3 physician office visits per year as compared to 4.4 for non-metropolitan residents. Results of the National Health Interview Survey (1980) indicate that fewer residents (i.e., percent) of non-metropolitan areas had at least one visit to a physician in the proceeding 12 months compared to metropolitan residents (i.e., within a city as well as outside the city). In addition, a greater proportion of residents in non-metropolitan areas had not visited a physician for one or more years as compared to residents from metropolitan areas.

HMSA designation, as previously discussed, is based primarily upon the ratio of the overall population to the number of primary care physicians. Areas that are not considered class one or class two HMSAs by the ratio or high needs indicators may, in fact, have a shortage of physicians accepting Medicare patients, since of the primary care specialties, only internal medicine and general or family practice would be relevant (although a small proportion of gynecologists' time is also possibly relevant). Further, since the ratio is based upon the total population, it does not factor into account the higher service needs of the elderly or disabled for subspecialists such as ophthalmologists and urologists (Marder et al., 1988). In addition, chronic conditions, such as high blood pressure and arthritis, which are prevalent in the Medicare population, require frequent treatment. Thus, in evaluating the difference in access for Medicare beneficiaries between shortage areas and non-shortage areas, there is a need to take into account the greater medical needs of the Medicare beneficiary.

2.2 Additional Research Questions

The problem the bonus policy aims at correcting is that residents of HMSAs may have inadequate access to the services they need because too few physicians practice in the areas and those who do practice there are less accessible to Medicare eligibles than they would be if they were paid higher fees. The assumption is that, for those physicians who are dependent on Medicare reimbursement, the financial viability of their practices may be in jeopardy if they earn too little from Medicare.

The fact is, however, that the lower rural fee, may actually be the equivalent of a higher urban fee if both bear the same relationship to the respective physicians' costs of practice. (See PPRC Report.) Where that is the case, then, even though the rural physician receives a lower fee in nominal dollars, he should be no more deterred from serving Medicare eligibles than his urban colleague.

This possibility can be examined empirically. To test the assumption, we should compare the relationship between the cost of practice and Medicare fees in urban areas and in rural shortage areas to determine the extent to which a deficit can be observed in rural areas. This can be done using a Geographic Practice Cost Index (GPCI).

Even if the relationship between costs and allowable charges is similar, however, rural elderly may still have a greater access problem than their urban counterparts simply because there are fewer physicians for the population. This is the concept of the HMSA, geographic areas in which the physician/population ratios are below acceptable levels. To test this possibility, the ratio of physician in specialties that commonly treat Medicare eligibles in rural and urban areas can be calculated and compared to a standard and to each other. In doing this, we would be particularly interested in family practitioners, general practitioners, and internists because they are the primary care-givers to the elderly (as opposed to pediatricians and obstetricians, for example). The population of Medicare eligibles would be the denominator. These data are available at the county level in the Area Resource File.

Finally, even if the physician-population ratios in rural areas are lower than those in urban areas, the actual amounts and types of utilization might still be adequate. Less utilization does not by definition mean inadequate utilization. To examine this aspect of the question ideally would involve a two-step process. First, utilization rates could be calculated for urban and rural shortage and non-shortage areas to determine the size of the discrepancy between them. They might be small enough to be trivial or large enough to signal a major problem. (Note that we would have the capacity to

conduct such an analysis at the county level for the 10 states for which we have market-level Medicare eligibility and Part B utilization data.) Secondly, a review of medical records would provide information about the treatment of rural and urban patients with the same conditions. It might be that, because of more limited resources in rural (and HMSA) areas, physicians practice more conservatively and efficiently there than in urban areas, but without compromising access to needed care. Utilization rates, for example, might be closer to those of well-run HMOs or of some European countries than to fee-for-service rates in the urban U.S. Some of these questions may be answered empirically by sampling medical records of patients identified in the 10-state Medicare Part B data base with a handful of diagnoses.

3.0 PHYSICIAN INCENTIVES

The purpose of this chapter is to assess the efficacy of bonus payments as a policy instrument for influencing the practice location decisions of physicians in urban shortage areas. Specifically, we wish to assess the validity of two implicit assumptions underlying the proposed extension of bonus payments to urban shortage areas:

- Physicians will be attracted to provide care in shortage areas by higher fees.
- Physicians who would otherwise leave the shortage areas will be induced to stay by a five percent bonus.

Our assessment of these assumptions will be made on the basis of a review of empirical findings contained in past studies examining factors affecting the practice location decisions of physicians and their response to financial incentives. Given the relative paucity of studies specifically addressing the intra-urban practice location of physicians, we have also drawn upon the more voluminous literature addressing the interregional and urban/rural location decisions of physicians. Since a number of detailed literature reviews on physician location patterns (Ernst and Yett, 1985; Graduate Medical Education National Advisory Committee, 1981; Hadley, 1980; Institute of Medicine, 1976; Lave, Lave, and Leinhardt, 1975), our review will be limited specifically to research findings of direct relevance to the influence of financial incentives. The remaining sections of this chapter will be organized with respect to the two assumptions underlying the bonus payment policy listed above.

3.1 Physician Location Decisions

Assumption No. 1: Physicians will be attracted to provide care in shortage areas by higher fees.

Under conventional labor market theory, geographic markets for physicians should be equilibrated through the market force of physician net earnings. In geographic markets where net earnings are high (low), physician

supply should increase (decrease) in the short run in response to net real earnings differentials.* While some net earnings differentials may persist across locations even in the long run if physicians value non-pecuniary quality of life attributes of certain locations, physician locational patterns would still be the result of response to financial opportunities in geographic markets.

Lawlor and Reid (1981), Newhouse et al., (1982a, 1982b), and Schwartz et al., (1980) have offered plausible arguments to support the premise that the existing spatial distributions of physicians are an expected outcome of such market processes. These studies draw upon standard economic location theory, which posits that producers of services with lesser per capita demand will be spatially concentrated in more populated geographic markets, while producers of services with greater per capita demand will be more spatially diffused among geographic markets of varying population sizes (Beckmann, 1968 and Richardson, 1969).

Since the demand for physician services should vary among specialties, standard location theory would predict hierarchical patterns in the geographic distribution of physicians by specialty. Whereas general practitioners should locate in geographic markets of all sizes, specialists with lower per capita demand for services should only be found in more populated geographic markets where their higher threshold service population can be served. Furthermore, this theory would suggest that physicians will become more spatially diffused among lesser populated areas when the overall stock of physicians expands relative to population demand.

Studies by Newhouse et al., (1982a, 1982b), Schwartz et al., (1980), and Lawlor and Reid (1981) demonstrate that the geographic distribution of physicians by specialty generally conforms to that expected under standard location theory, and that the distribution of physicians has become more

*It might appear that if physicians can induce demand for their services (Feldstein, 1970; Newhouse, 1970), physician locational behavior would not be responsive to the market forces described here. Newhouse et al., (1982) have demonstrated that even in the typical induced-demand utility maximization model (e.g., Evans (1973)), the same market behavior of spatial diffusion of physicians in response to market forces would occur as a result of utility differentials across locations.

spatially diffused as the supply of physicians has increased over time relative to population growth. While these studies are suggestive of physician market response to financial incentives, they provide no direct empirical evidence from which to assess the supply impact of higher Medicare physician fees in shortage areas. The influence of financial incentives on physician location has been addressed more directly in a number of multivariate empirical analyses of physician location patterns which employed some measure of financial opportunity as a potential factor explaining physician location choices.

While our real interest lies in whether bonus payments will attract physicians to provide care in urban shortage areas, our assessment of past research will encompass both regional and intraurban studies of physician location.

3.2 Regional Distribution of Physicians

A major distinction among empirical studies of regional location of physicians is their definition of physician supply. Physician supply has been most commonly measured cross-sectionally as a stock measure of all physicians, or physicians per capita. A smaller number of studies have employed flow measures of supply in terms of the locational choices of recent medical school graduates choosing an area (or type of area such as urban versus rural location) as their first practice location. A few studies have analyzed changes in the number of physicians or in physicians per capita. We could find no study which specifically analyzed the relocation of physician practices through migration.

These distinctions are important in evaluating the impacts of higher physician fees in shortage areas on physician supply. The physician stock in an area should be at least partially the result of practice location choices that were made many years ago. While empirical evidence is lacking, Yett and Sloan (1985) suggest that established practitioners are only likely to be sensitive to earning differentials that are large enough to offset the lower

net income associated with the development of a client base or system of referrals when starting a new practice, and the pecuniary and psychic costs (e.g., the break of personal friendships, adverseness to the risks of entering unfamiliar areas, etc.) of moving. Since the response of new physicians to financial incentives may differ greatly from that of established practitioners, our discussion of regional physician location is further classified by stock versus flow analyses of physician location behavior.

Physician Stock and Financial Opportunities

A number of different measures of financial opp[illegible]een specified in empirical studies of physician location. [illegible]udies have been able to employ measures, such as average physician net income or fee levels for office visits, as supply price variables, such data have not generally been available for most studies. Hence, a large number of studies have had to resort to the use of proxy variables for potential physician earnings. Most studies have employed some income measure for the entire population (e.g., income per capita, median family income, or the percentage of population above or below a certain level of income) under the implicit assumption that physician incomes will be higher where incomes are higher for the general population. For the most part studies have found some measure of physician or population income to be at least moderately associated with physician stocks.

Several of the earlier econometric studies of physician location (Sloan, 1968; Fuchs and Kramer, 1972; Hadley, 1978; Harrison and [illegible]d, 1973; Ramaswamy and Tokuhata, 1975), found stocks of physicians in [illegible]hic regions, such as states or Canadian provinces, to be positively associated with a measure of physician net income. Employing smaller geographic units for urban areas within states (i.e., Standard Metropolitan Statistical Areas (SMSAs)), Cantwell (1979) found the number of nonfederal patient care physicians to be positively associated with the average fee for a follow-up physician visit.

While these early studies all support the hypothesis that physician stocks are associated with financial opportunities, other studies have found either mixed evidence, or no support for the proposition. Benham, Maurizi, and Reder (1968) found physician income to have a positive but insignificant relationship with the number of physicians, physicians per capita, and decennial changes in both variables at the state level. Population size and population growth were found to be the most important determinants of physician stock and it change, respectively. Evashwick (1976) found that while physician stocks were positively correlated with population income levels for a set of non-metropolitan trade areas, changes in physician stocks were actually negatively correlated with changes in income levels. Rosett (1974) found a positive but insignificant association between physician stocks and the profit rates of solo practitioners at the SMSA level.

While other factors were found to be more dominant explanatory factors, a number of other studies have found moderate positive associations between physician stocks and population income measures. The pioneering work of Rimlinger and Steele (1963), for example, suggested that population or its change was the most important determinant of physician stock distribution and its change. Similar findings were obtained by Marden (1966) and Reskin and Campbell (1974) for SMSAs. Joroff and Navarro (1971) (using SMSA geographic units) and Evashwick (1976) both found that the dominant factor associated with physician stock was the percentage of population greater than 65 years of age. Purchasing power and income measures in these two studies added only marginal explanatory power. Feldman (1977) found a moderate positive association between physician stocks and per capita income at the state level, but an insignificant association with office input wage levels. Watson (1980), Ball and Wilson (1968), and Lankford (1974), all found some measure of population income level to be significantly associated with physician stocks using varied spatial definitions of metropolitan areas.

New Physician's Location Choice

The literature on the locational choice of new physicians has also yielded somewhat mixed implications regarding the influence of financial opportunities. Yett and Sloan (1974) found that a measure of state physician

net income had a negative (and in two cases statistically significant) impact on the retention of recent medical school graduates in a state. Hadley (1975) found no significant association between the likelihood that a recent medical school graduate would locate in a state and relative measure of mean net physician incomes. Measures of prior contact with the state were found to be more important factors in locational choices. Held (1972) obtained similar findings for a model where locational choice propensities were defined as the ratio of the number of medical graduates entering a state to the number of white males migrating to the same state, and financial opportunity was measured by the state mean profit rate for solo practitioners. However, Held did find a significant positive association between locational choice and profit rate for physicians with residence training in that state.

The work of Wilensky (1979) is one of the few studies of new physician location choice that yielded empirical findings consistent with the proposition that physician practice location choice is sensitive to financial opportunities. She estimated a location choice probability model of the likelihood of a physician deciding to practice in Michigan. Financial opportunity was specified as the ratio of net physician earnings in the physician's chosen state of practice to net earnings in either their reported second choice state of practice location, or their state of most recent prior contact.

A large number of attitudinal studies of the location preferences of medical graduates complement the majority of empirical studies above by lending only modest support for the importance of financial opportunities as a factor affecting practice location choice. General preference for urban or rural living conditions (Heald et al., 1974; Steinwald and Steinwald, 1975), preferences for residing near one's hometown (Parker and Tuxhill, 1967; Cordes, 1978), preferences for climate or availability of social, cultural, or recreational opportunities (Heald et al., 1974; Longnecker, 1975), have often been found to be more important than financial opportunities in such studies. Furthermore, other professional factors such as proximity to hospital resources (Heald et al., 1974) nearness to a medical school and/or access to

collegial contact (Parker and Tuxhill, 1967; Parker and Sorenson, 1978), shorter and/or more regular work hours (Cantwell, 1976; Langwell and Budde, 1978), and greater opportunity for group practice membership (Diseker and Chappell, 1976; Parker and Sorenson, 1978), have been consistently cited as exerting a stronger influence than earnings opportunities upon the choice of urban versus rural practice locations.

Intraurban Physician Location

The intraurban physician location literature has attempted to assess the present distribution, trends, and determinants of the spatial distribution of physicians within urban areas. While this literature should be more relevant to questions about the potential effects of bonus payments in urban shortage areas than the regional location literature discussed already, far fewer empirical studies have been undertaken. Furthermore, the implications of their empirical findings toward the likely impact of bonus payments has been limited by the absence of direct measures of physician earnings. Hence, whether physicians respond to financial incentives in their intraurban location decisions can only be assessed indirectly on the basis of whether their location decisions are significantly influenced by demand factors. Finally, there are difficulties in truly generalizing findings from selected large cities, such as Chicago or New York, to other metropolitan areas with varied population sizes and historical residential and commercial spatial development patterns.

At a broad level, the literature suggests the emergence of two general patterns in the changing intraurban distribution of physicians since the early 1950s. First, there is ample evidence suggesting that the number of physicians has declined in lower income core areas of cities relative to physicians with suburban practice locations over time (Lepper et al., 1967; Fiore and Sokol, 1968; de Vise and Dewey, 1972; Roemer, 1966). While this could have implications toward physician access in inner cities, these trends are not at all surprising given the significant suburbanization of the population that occurred over the same time period. Second, physician

practice locations have become increasingly clustered spatially into fewer locales than in the past (Robertson, 1970; Gober and Gordon, 1980). This has been attributed to the increasing specialization of medical practice and expansion of group practices, making proximity to hospitals and office building locations more important to location decisions.

Econometric analyses of intraurban physician location have yielded consistent empirical findings regarding the influence (or lack of influence) of four factors on physician practice location concentration. First, virtually no study has found that the population size or population density of small area units in cities matter in explaining physician location patterns (Elesh and Schollaert, 1972; Guzick and Jahiel, 1976; Gober and Gordon, 1980). Second, Elesh and Schollaert (1972), Kaplan and Leinhardt (1973), and Guzick and Jahiel (1976) all found that metropolitan physicians were concentrated in subareas with large percentages of commercial land use, presumably because of zoning restrictions for office development. Third, physicians are more heavily concentrated in subareas with greater access to hospitals (Kaplan and Leinhardt, 1973; Elesh and Schollaert, 1972; Gober and Gordon, 1980). Finally, most, but not all, studies have found physician concentration to be correlated with the age composition (i.e, the percentage of elderly in the subarea) of intraurban subareas. (Hambleton, 1971; Elesh and Schollaert, 1972; Guzick and Jahiel, 1976).

Less consistent empirical evidence has been produced concerning the influence of population income level, and its racial composition. Guzick and Jahiel (1976) and Elesh and Schollaert (1972) found significant positive correlations between stocks of all physicians (or general practitioners alone) and a measure of population income level in New York City and Chicago, respectively. On the other hand, Kaplan and Leinhardt (1973) found no association between income and physician office concentration in Pittsburgh, and Hambleton (1971) found no significant associations in a sample of zip code areas for 15 different cities. Whereas Hambleton (1971) and Guzick and Jahiel (1976) found significant positive correlations between physician concentrations and the percentage of black population in urban subareas,

Ellesh and Schollaert (1972) found a significant negative correlation. Kaplan and Leinhardt (1973) found no significant partial correlation between racial composition and physician concentration.

Overall, the literature on the intraurban location of physicians would suggest that physician locations are indeed influenced by professional and economic market factors. The importance of professional factors is well documented. Physicians are not uniformly distributed within cities, but are spatially clustered in areas providing professional amenities. However, similar to the regional location literature, there is no consistent body of empirical evidence to support the premise that physicians responses are very sensitive to financial incentives in their intraurban location decisions.

3.3 Retention of Physicians

Assumption No. 4: Physicians who would otherwise leave shortage areas will be induced to stay by a five percent bonus on Medicare fees.

This assumption raises a number of questions pertinent to assessing effects of bonus payments on physicians already practicing in shortage areas, including:

- Are physicians more likely to leave shortage areas than non-shortage areas?
- To what extent do physicians leave shortage areas for financial reasons?
- Will a five percent bonus on Medicare billings be sufficient to induce physicians to continue practicing in shortage areas?

Our discussion of the implications of past research will be organized around these three questions.

Are physicians more likely to leave shortage areas than non-shortage areas?

The literature on physician location has not produced much, if any, information on the rates at which physicians relocate their practices generally, and in particular, the rates at which they leave shortage areas.

The bulk of the physician location literature that has studied changes in physician supply has focused on changes in physician stocks over time. Since the change in physician stock between any two time periods t and t+1 is the net result of the actual in-migration and out-migration of practicing physicians, the first practice establishment of recent graduates, and the retirement or death of practicing physicians, it is impossible to directly infer anything about the outmigration of physicians from an ar[illegible]

Despite these shortcomings, the physician location liter[illegible]s compiled evidence on changes in physician stocks by urban-rural location, and by size of place over recent decades. (Ahearn and Fryar, 1985; Newhouse et al., 1981; Schwartz et al., 1980; Newhouse et al., 1982; Kindig et al., 1987; Miller et al., 1978; Langwell et al., 1985; Dennis, 1988; Ernst and Yett, 1985; Fruen and Cantwell, 1982; Public Health Service, 1983.) The bulk of these studies suggest that the number of physicians of all types in rural areas has not changed much over the last decade. While general and family practitioner physician stocks have decreased, this has been largely offset by increased stock of specialty physicians in rural areas. The fact that rural area changes have largely followed those of national physician stocks has lended support to Newhouse, et al.,'s arguments about the hierarchical diffusion of physician stock toward smaller geographic areas.

There is little hard empirical evidence to assess the relative contributions of outmigration or immigration to changing physician stocks. The few studies which have distinguished changes in stocks of physicians younger than 35 years of age, suggest that much of the change in stock is attributable to location decisions of new physicians rather than the relocation of experienced practitioners. (Langwell, et al., 1985, Public Health Service, 1983.) Still it is unclear, for example, in the case of a shrinking stock of rural primary care physicians, whether more new primary care physicians have left initial rural practice locations, or fewer new primary care physicians have sought rural locations for their initial practice site. There is little good empirical information on physician outmigration from rural areas.

To what extent do physicians leave shortage areas for financial reasons?

The little empirical information that apparently exists about reasons for physician outmigration from shortage areas pertains to rural practice locations, and suggests that financial earnings limitations are less important than professional factors. The work of Parker and Sorenson (1978) which surveyed physicians leaving rural practices found that 33 percent of rural outmigrant physicians reported that the area in which they practiced yielded too limited an income. However, eight other reasons were cited much more frequently by respondents. These other non-financial reasons included both professional and social factors, including such things as the limited opportunity for professional interaction and growth in rural areas, the long hours and irregular time schedule of rural practice, and lack of professional support of other physicians.

While there is a paucity of empirical literature on why physicians might leave a rural practice location, the evidence that does exist is consistent with that found in the broader physician location literature. That is, even though financial factors have some importance, other professional and social factors are more often critical factors leading to decisions to leave rural shortage area practice locations.

Will a five percent bonus on Medicare billings be sufficient to induce physicians to continue practicing in shortage areas?

While the physician location literature reveals mixed findings concerning physician response to financial incentives in their choice of location, a stronger case could be made that a bonus on Medicare billings in shortage areas may be somewhat more successful in retaining physicians whose practices are already located in these areas. Whereas relocation of a physician practice to another location is likely to be impeded by such factors as the start-up costs of developing a new patient base, and the pecuniary and non-pecuniary costs of migration, financial inducements to existing physicians in shortage areas will not have to offset these transactionary costs of relocation. In fact inducements will likely strengthen the inertia for a physician retaining his/her existing practice location.

The premise that physicians will respond to financial incentives of fee levels in their participation decisions regarding public Medicare and Medicaid programs has been well established in the literature. A large number of empirical studies have concluded that more generous reimbursement rates encourage Medicaid participation and/or the acceptance of Medicare assignment rates by physicians. (Davidson et al., 1983; Mitchell and Cromwell, 1982; Hadley, 1979; Mitchell, 1983; Rice and McCall, 1982; Sloan et al., 1978; Lee and Hadley, 1981.)*

These findings may appear to be at odds with those presented earlier indicating that physicians are not very responsive to financial incentives in their choice of practice location. One likely reason for the difference between these two sets of findings is that physicians presumably may expand their Medicare or Medicaid patient case loads (because of excess capacity, or by decreasing private payer case loads) without changing their practice location.

Since the physician supply literature suggests that the number of physicians will not change much in shortage areas due to higher Medicare rates, service access for Medicare beneficiaries may only improve if bonus payments of five percent are sufficient to induce current physicians, who would otherwise leave, to stay in shortage areas, and to increase their Medicare patient load. There is little readily available data from which to assess how much of a difference bonus payments of five percent would have upon physician gross and net incomes in shortage areas. Some insight into the potential effects of raising rural reimbursement rates to those found in urban areas for both non-Medicare and Medicare patients may be gleaned from the linear programming model of a rural practice developed in Wallack and Kretz (1981). While their findings are limited by the fact that the linear

*While these studies also suggest that reductions in public reimbursement rates will have a negative effect upon physician willingness to treat Medicare and Medicaid patients, fee reductions do not necessarily result in reduced program expenditures. (Rice and McCall 1982, Holahan and Scanlon 1979). Physicians may respond to lower fees by providing more, or more costly services, or by providing fewer services and leaving patients to seek care in more expensive sites (e.g., hospital emergency rooms or outpatient departments).

programming model parameters were based on the operations of only one of their case study sites, their model suggested that a 7.4 percent increase in reimbursement rates would result in a 26.4 percent increase in net physician income. Since the rural practice modeled in Wallack and Kretz (1981) served both Medicare and non-Medicare patients, the impact of raising only Medicare reimbursement rates on physician net incomes should be smaller since shortage area physicians will presumably serve both Medicare and non-Medicare patients.

The U.S. General Accounting Office (1986) has reported that nationally, the percentage of physician gross income received from Medicare reimbursements (not including beneficiary co-pays) was only 17 percent. The national percentages were reported to vary by physician specialty from one percent for pediatricians to 35 percent for thoracic surgeons. Since the fraction of elderly population is generally higher in rural areas, these fractions may understate the percentages for physicians serving rural shortage areas (U.S. Bureau of the Census, 1983). Nevertheless, these average GAO figures would suggest that in the absence of any supply response by physicians, a five percent bonus on Medicare billings in shortage areas might be expected increase physician gross incomes by less than one percent (i.e., 5 percent times 17 percent). Since professional expenses were reported to be roughly 38 percent of gross professional income, on average nationally, for all physicians in the same report, net incomes might be expected to increase by roughly 1.4 percent.

Clearly, the estimated increase in net income from the bonus will vary depending upon the distribution of physician net income and the fraction of their income from Medicare reimbursements. The estimated increase would understate the impact of a five percent billing bonus on net physician incomes in shortage areas to the extent that: 1) the proportion of physician gross income attributable to Medicare is significantly higher than 17 percent in shortage areas, and/or 2) physician expenses in proportion to gross revenue are significantly higher than 38 percent in shortage areas, and/or 3) physicians respond to the bonuses by provision of more Medicare services. While it is currently unknown whether substantial differences do exist

regarding the proportion of Medicare income or expenses to gross revenue in shortage areas, unless they do, bonus payments in urban shortage areas are unlikely to produce any significant locational supply response on the part of physicians.

3.4 An Assessment of the Implications of Past Research

It is fair to conclude that at best, past research has yielded mixed evidence to support the premise that physician locational choice is strongly influenced by financial incentives, Yett and Sloan (1985), Institute of Medicine (1976), Hadley (1980), Lave, Lave, and Leinhardt (1975), Graduate Medical Education National Advisory Committee (1981), and Eisenberg and Cantwell (1976) have all reached similar conclusions in their reviews of the literature.

The strongest empirical support for the proposition is found in econometric models of physician stocks among states. However, these study findings are of questionable utility for assessing the impacts of bonus payments on physician location in urban shortage areas on two grounds. First, as the Institute of Medicine (1976) has maintained, analyses of state physician concentrations provide indirect evidence at best about factors explaining geographic disparities in physician concentration since physician distributions within states are quite heterogeneous. Second, given that physicians face a number of pecuniary and psychic costs to relocation, physician stock measures may be less appropriate then flow measures in assessing the extent to which physicians will respond to financial incentives arising from government policy. The weight of the empirical evidence from studies employing flow measures, such as the location choices of recent medical education graduates, is that non-pecuniary factors may influence practice location choices more than financial opportunities.

On the basis of past research indicating that physicians may be more responsive to financial opportunities when it does not involve moving their practice location, it would appear that bonus payments may be more effective in retaining physicians already serving shortage areas. In this instance,

could strengthen the existing locational inertia factors that physicians from easily leaving their current practice to start elsewhere.

little empirical information available to assess the extent to ments might be successful in retaining physicians in urban however. The only available empirical data show that es are not generally very dependent on Medicare reimbursements. ests that bonus payments will only have a modest impact on the physicians, and consequently may have little policy impact.

4.0 FEASIBILITY AND IMPLEMENTATION

The final two assumptions relate to feasibility issues. They recognize that a policy is more than a set of incentives. It is also behavior of government officials that, in some instances, requires and in others, merely encourages certain desired behaviors by other affected parties. Feasibility concerns the reliability that the desired behaviors will actually occur following the introduction of the policy, as well as the costs of implementation, and the nature and magnitude of additional or secondary consequences of the policy. In this chapter, we consider these issues.

4.1 The Secondary Consequences

> Assumption No. 5: The inevitable side-effects of the policy will not be too large to undermine the accomplishments. These secondary consequences include the cost of the policy, the ease of implementation, and that it not result in any large windfall to physicians who already practice in the area.

In assessing the policy, the process of implementation must be considered because estimates of costs must include the cost of implementation, as well. In addition, unintended side effects may result from implementation of the policy and they must be examined, as well.

4.1.1 Implementation Requirements

To bring the policy to fruition will require several steps by the carrier. They include 1) identify the physician-shortage areas; 2) provide detailed, comprehensive information regarding the location of eligible HMSAs (i.e., Class 1 and Class 2 geographic HMSAs) in each state; 3) identify the physicians who supply services in those HMSAs; 4) modify the claims processing system to recognize and process eligible claims, 5) identify the services provided by physicians in the HMSA to Medicare eligibles; 6) sum the fees paid for those services covered by the policy; 7) calculate five percent of that

figure and pay it to the physicians on a quarterly basis; and 8) monitor the plan to maintain both the efficiency of the program and its integrity. Carriers are also expected to review a random sample of at least 10 claims for the top three percent of the eligible physicians (HCFA, Transmittal, December 12, 1988).

The five percent incentive payment to all physicians for services delivered in rural shortage areas will be based upon whether the service was rendered in a class one or class two HMSA (see Section 1.3), regardless of whether the service was provided in a private office, a hospital or any other facility. Carriers will pay on the basis of rural HMSAs which, according to the PHS definition, are those considered to lie outside metropolitan statistical areas. This definition of rural areas coincides with the one used by HCFA for PPS as a requirement under OBRA 1987. Services provided in any place of service (such as a hospital) outside the HMSA are excluded even if the physician's office is within the HMSA. The incentive payment program will be based upon physician claims for services rendered on or after January 1, 1989. As planned by HCFA, physicians will be notified of the incentive program by the individual carriers through "provider manuals" and also provided with a booklet listing shortage areas by county within the state. Physicians who are practicing in a subcounty HMSA, can request a map indicating the boundaries of the HMSA to determine if they are eligible for the incentive payment. The map, which is being produced by a private contractor, will indicate landmarks such as highways, rivers, and other points for orientation.

Even with the maps, problems are likely to arise regarding the location of particular sites of care in subcounty HMSAs according to staff in HCFA's Bureau of Program Operation; and it is likely that there will be some initial confusion on the part of physicians regarding their eligibility to receive incentive payments.

Incentive payments of five percent to physicians will be made quarterly, based upon the total amount actually paid for services provided that quarter in eligible shortage areas. Both participating physicians (those accepting

assignment) and non-participating physicians are eligible. Physicians working in facilities that bill for Part B services, all specialists, and group practice physicians will be eligible as well.

Current Medicare claim forms are being modified to capture information regarding services provided in shortage areas. The form will be altered to include an additional set of boxes under the type-of-service field to indicate whether or not the particular service was provided in a HMSA.

The incentive payment program will be open to gaming as well as potential abuse. Post-payment review will be the only method to determine the veracity of submitted claims but will be rather limited in scope. The claim form will indicate only whether or not the place of service was in a HMSA but will not give the exact location (e.g., the address where the service was actually provided).

In the next several pages, we discuss some of the key implementation issues in more detail.

4.1.2 Identifying the Physician Shortage Areas

This is the easiest and least expensive element of implementation since the Bureau of Health Professions already publishes annually an updated list of primary care physician shortage areas. It is important to reiterate, however, that 1) those HMSAs are designated for a different purpose than the one being considered here; 2) some of the data used to calculate the physician/population ratios for that purpose may not be relevant for the purpose of implementing the policy that is the subject of this report; 3) the ratios which serve as the standard for the present purpose may not be appropriate for the proposed policy; and 4) while the processes used to update the list may be adequate for the original purpose of the HMSA, especially in its current limited state, they may not be sufficiently accurate for the new policy.

Since the incentive payment policy applies to only class one or class two HMSAs, it will exclude physicians practicing in 39.3 percent of the rural HMSAs and 29.3 percent of the urban HMSAs. The degree of shortage designation may be less applicable to the Medicare population for two reasons. One reason is that the cutoff ratio for setting the degree of shortage is not a well established measure, and various experts have proposed differing proportions for the minimum number of physicians needed to serve the population adequately (Manard and Lewin, 1983; Woolf et al., 1981). In fact according to Harris (1986) depending on which model of physician supply you choose (e.g., GMENAC) you arrive at different estimates. Secondly, the high needs indicators that are used have little relevance to the medical needs of the Medicare population. Thus in terms of the number of physicians treating the Medicare population, Medicare beneficiaries within these eliminated HMSA (degrees 3 and 4) may have reduced access to the same degree as beneficiaries in other HMSAs.

The primary standard used by the Bureau of Health Professions to designate a primary-care HMSA is 3,500 residents for each primary care physician. As we saw in Section 1.3, while it was a reasonable approximation given the state of both knowledge and data at the time it was set, that standard is to some degree arbitrary. That is, it is not based on objective evidence that 1) ratios greater than 3,500 to 1 produce utilization rates that are inadequate to the needs of the elderly, and 2) ratios smaller than that lead to satisfactory rates. Moreover, since that ratio, whatever its limitations, was intended to apply to the entire age spectrum, it is likely that a lower ratio of Medicare-appropriate physicians to Medicare eligibles (or elderly) would be a more suitable standard for the proposed policy since utilization rates are higher for the elderly than for other adults and all but the youngest children.

The Physician Payment Review Commission (1987) has criticized the shortage area designations as working poorly in urban areas, and the technical problems of identifying and verifying physicians who deliver services in urban shortage areas has already been discussed in Chapter 1.3.3. Massachusetts is

a prime example with 17 of 18 HMSAs located in metropolitan areas, and only parts of cities designated as HMSAs. We compared four 1987 Massachusetts HMSAs with census tract data and found all four excluded parts of cities from the HMSA designation. According to a review of actual applications, areas of cities were excluded if they had adequate numbers of primary care physicians or did not exhibit high poverty. According to Richard Lee, Office of Shortage Analysis, the degree of shortage within an urban area may be greater for certain population groups than the degree of shortage (if actually present) for an urban geographic designated HMSA. Physicians practicing in cities that are considered shortage areas from the standpoint of special populations will be ineligible for the bonus payment if the original shortage area designation failed to meet the geographic designation criteria. Rather than relocate their practice to the part of the city covered by the designation, physicians are likely either to contest the HMSA designation process and seek designation where their practice is located or since the bonus is small, to ignore the whole process.

Implementation of the bonus payment for physicians practicing in urban areas will also be compounded by a number of technical problems related to continual verification and designation of urban shortage areas. If this program is implemented in urban areas, physician groups will likely contest why they are ineligible for the bonus payment even though nearby colleagues from within the same town or city are eligible. With the demise of HSAs and SHPDAs, future designation and de-designation of HMSAs for the incentive payment program may be stymied by the inability to verify data at a local level. With the eventual elimination of the NHSC, physicians rather than communities, will have the only reason to seek designation of their areas as shortage areas.

Finally, patterns of medical practice and the utilization rates that reflect them are influenced to some degree by the economic and other conditions in which they are produced. Thus, standards set in a fee-for-service mode of payment are likely to be higher than those set in a

good HMO. Similarly, those which reflect patterns in an urban area with higher physician/population ratios are likely to be higher than those in a rural area partly because, in a variant of Parkinson's Law, the amount of utilization tends to expand to fill the available physician time. Thus, some portion of the ratio is attributable to the number of physicians available to provide service in the area and not to objective measures of patient need.

Even so, when all the adjustments are made and a standard is derived that is appropriate to the needs of the elderly, it may turn out that the same areas designated as HMSAs under the Bureau of Health Professions' present methodology would be designated as HMSAs using a Medicare-specific methodology. All of these possibilities can be tested empirically, though some, with a greater degree of precision than others.

4.1.3 Identifying the Physicians Who Treat Medicare Eligibles and the Services Provided

This is another relatively easy step that can be performed using the computer that pays Medicare claims. Since the computer can identify those physicians, it can be programmed to select for the bonus those physicians who treat Medicare eligibles in the HMSA.

Again, the computer makes this job relatively easy. In theory, it is possible to identify those services provided in the HMSA and, thus, those to which the bonus should apply. In some instances, the reality, too, is simple; but in some cases, it is not. In those situations in which the HMSA is a county, the inclusion of a space on the claim form for the physician to indicate the address of the site of care, including county, should suffice. When the HMSA is a sub-county area or when it includes parts of several counties, the computer will need to be programmed to recognize that the particular address on the form is located in a HMSA. This is complicated because of the large number of such HMSAs (In 1988, the number was 1,586) and the still larger number of possible addresses in each. It becomes a tedious and laborious process that will require many person-months to complete.

For this reason, HCFA's decision to modify the claim form to require only that the physician indicate whether or not the service was provided in a HMSA opts for simplicity at the expense of both precision and the potential for verification.

4.1.4 Calculating the Five Percent Bonus

Assuming the previous step is completed satisfactorily, this is a simple step, too, although it has several wrinkles that add complications. First, since, for maximum impact, the bonus will be paid not as a percent of each bill, but as a percent of a total aggregated over a calendar quarter, the question will be what to include in each quarter's total. Ideally, it should be all services provided in that quarter. The problem is that many bills do not come in promptly, and many months may elapse before the fiscal agent can close the books on a given quarter's service. If the policy were to wait until the books were closed, then the first check would not come until, perhaps, a year after the first service in that quarter was provided. Any impact of the policy, thus, would be seriously compromised.

Instead, the bonus could be applied to those bills actually paid in a quarter. To do so would require that the date of payment be entered as a field in the claim record and that the computer be programmed to recognize the inclusive range of dates. This is necessary to ensure that the bonus is applied to all appropriate claims, no matter when they are paid; and that it is applied only once to each claim. This is a reasonable solution to the problem but it, too, would dilute the effect of the policy since the first period would include only those services provided after the start date of the program that were paid in the first quarter. This is likely to be a relatively small dollar amount and, while it will increase as implementation increases and reaches a steady state, nonetheless, the impact in the beginning will be reduced. If this is the option adopted, any evaluation of the effects of the policy should be delayed.

4.1.5 Monitoring the Plan

The effective management of any program requires continual monitoring for three purposes: to ensure that it is being operated efficiently; to protect against errors, fraud and abuse; and to determine that the purpose of the policy is being accomplished. Much of the implementation of this plan depends upon the computer, and that means the required data must be entered (there must be a place for every item, and each data element must be entered) and that the machine be programmed to accomplish its tasks most directly and at least cost. It is beyond the scope of this report to say more about these functions; the essential point is that they must be performed.

To protect against error and fraud, data must be required in a form that, potentially at least, is easily verifiable. As an example, HCFA might want the capacity to determine that services which were claimed to have been provided in HMSAs were, in fact, provided there. One level of verification would be to determine that the site at which the service delivered was actually located in the HMSA. To provide this first line of verification, it would be a good idea to require that the provider enter the address at which the service was provided so that a computer algorithm could check it. It would be insufficient for this purpose merely to provide a box which the provider can check that the service was provided in a HMSA because it gives the monitor no help in verification. The second level of checking would be for a monitor to visit a sample of sites and review the medical records that would support claims that particular services were provided. These checks are expensive and would be done only on small samples, but the important point is that the routine record contain information that would not preclude the effort.

Finally, by including data on which services were provided; where and by whom they were furnished; their cost; and, of course the bonus itself, evaluators would have the raw material to determine whether or not access was maintained or increased (two of the goals of the policy) and the cost of that result. They could conduct time series analyses which show changes in utilization rates in shortage areas and compare those results with trends in

other areas. Whether or not such analyses were actually conducted, the potential would be there to do so, and that is the important point to make here.

4.1.6 Urban Areas Implementation Issues

With the caveats discussed above, all of these problems are relatively simple to solve in rural areas, especially where the HMSA is a complete county. They become much more difficult in urban areas because the distances are closer, and it is harder to draw neat boundaries around behavior.

To illustrate the problem: an urban physician attracts patients from an urban HMSA even though his office is not located in the HMSA. If the bonus is large enough or if the costs are low enough, he may decide to establish an office (full-time or part-time) in the HMSA. Thus, assuming he already is treating all the patients he can from the area, he would be collecting a five percent bonus for providing the same services that he would be providing without the bonus in another location. It may also be possible for him to increase the services provided to that clientele, not because they are truly necessary but because they are available (a service with some small positive benefit may be provided when a physician is present and available but not provided when the same physician is too busy, with results for the two patients that are not measurably different). The benefit would be minimal, and the cost of the service would be increased by at least five percent. It may also be possible for a physician to shift his business to a location within the HMSA. Thus, he would be collecting higher fees for treating Medicare patients, some of whom might live outside the HMSA.

The point is that, in an urban HMSA, since distances are so much shorter and transportation is often easier than in rural areas, physicians and patients alike have more mobility; and as a result, it may be possible to spend the bonus money within the letter of the program without achieving the intended benefit.

From an implementation point of view, it would be harder than in a full-county rural HMSA to establish that 1) a patient lived in the HMSA; 2) a service was provided in the HMSA; and 3) the additional access (i.e. utilization) that resulted from the policy had value equal to the bonus payments.

4.2 Estimating the Costs and the Benefits

Assuming the program can be implemented reasonably, it becomes a sensible policy if the cost is not larger than the benefit and if the goal could not have been accomplished more cheaply with another strategy. To test both parts of the assumption, it is necessary to estimate the program's cost. Components include: 1) the cost of the administrative functions associated with implementation; and 2) the bonus payments paid to physicians providing services in HMSAs.

To estimate the cost of implementation, we can inquire of HCFA and a sample of fiscal agents as to the costs incurred in 1) identifying HMSAs; 2) for sub-county HMSAs, designating addresses that were located within the HMSA and programming the computers to recognize them; 3) programming associated with identifying those claims to which the bonus payments apply, aggregating those claims, applying the bonus rate, calculating the dollar amount, and issuing a check; 4) redesigning and printing claim forms in order to capture the information necessary for the plan; and 5) staff at HCFA (nationally and in the regions) and at the fiscal agents needed to implement and monitor the plan. In the absence of such data, it can be noted that, first, some of these functions, while complicated, need to be performed only once (including perfecting the computer programs) and, thus, their costs would not be recurring. Secondly, undoubtedly, some of the staff required for the on-going functions would be people already working at HCFA or for the fiscal agents, who would be assigned additional duties. Presumably, doing so, would reduce the incremental costs associated with the policy.

itimate the cost of the services prior to implementation, we could
ledicare payments to physicians practicing in HMSAs in the 10 states
ve have several years of Part B Medicare claims. We could then
ie figures with estimates of utilization increases attributable to
of physicians who would relocate (full-time or part-time) to HMSAs,
istments to fees due to inflation, introduction of RBRVS, and other
:n conducting the analysis, we would also estimate the extent to
hortage areas would change.

we would estimate changes in utilization following implementation
ous scenarios. For example, one set of estimates could be for no
itilization rates. Others would be for 10 percent, 20 percent, 30
:c. increases in utilization rates. Similar adjustments would need
for changes in the population of elderly (due to deaths of some,
hers and immigration to rural areas) and changes in the supply of
(due to retirements, moving from area, moving to area).
estimates would be relatively straightforward for full-county
. They would be more complicated for sub-county rural HMSAs; and
difficult for sub-county urban HMSAs.

native Policies

ption 6: This policy is the least expensive, easiest to implement
y that would accomplish the goal reliably.

we are unable at this point to predict the cost of the
t bonus policy, we have been able to show that some elements of the
ion are relatively simple and inexpensive. On the other hand, we
rovided some reason to doubt that additional payments equal to
t of a physician's Part B Medicare billings will be sufficient to
physicians to increase their accessibility to Medicare patients.
es suggest that, with the possible exception of physicians for whom
tients comprise a very substantial segment of their practice, the
ablishing in the HMSA either a part-time second office or a new

substitute office would be prohibitive given the limited return that can be expected from higher Medicare fees. The physicians who were already there may be marginally more willing to treat Medicare patients compared to other patients, but they are unlikely to act to make their location more accessible. (They might be encouraged to remain open for additional hours in the evening and, thus, increase their capacity in that way, but we suspect that action will have little impact on the use of services by Medicare beneficiaries.)

Given this rather bleak expectation, and assuming the problem remains, what alternatives are there for increasing access to services for Medicare patients? In the next sections, we consider three possibilities: one is to increase physician fees under Medicaid; to revive the National Health Service Corps program, and finally to boost Medicare fees for providers of primary care services. We will discuss each in turn.

4.3.1 Raise Medicaid Fees

Assuming that access to physician services is indeed a problem for Medicare eligibles because of insufficient numbers of physicians, to what extent would the incentive for physicians to treat Medicare patients be increased if the pool of potential patients were increased, as well? This could be done by including Medicaid eligibles and applying the five percent bonus to physician expenditures under both programs. The dollar amount might be considerably larger in some areas (depending on Medicaid eligibility criteria and the distribution of eligibles), there are two drawbacks to the adoption of this policy. One is that state governments make key decisions on major programmatic elements for Medicaid, including client eligibility criteria and fees paid to physicians, and they share in the cost of the program. State financial contributions vary from 22 percent in the poorest states to 50 percent in the wealthiest states. A state with generous eligibility criteria would include more eligibles, thereby increasing the

potential bonus a physician could earn for treating Medicare and
ients. Similarly, a state with competitive fees would attract
ans to the program to treat eligible patients, whereas low fees
physicians. In a state with restrictive eligibility criteria or
e incentive effect of the bonus would be reduced. Thus, the bonus
ifferential effects across states depending in part on state
criteria and physician fees. Persuading state governments to
n Medicaid by paying a share of a bonus to physicians would be a
ask even though the state's share would be no more than 2.5
many states it would be doomed to failure. On the other hand,
bar to the federal government's agreeing to pay the full amount of
top of its statutory percentage share. For several years in the
it did the opposite: annual federal contributions were reduced
cent, 3.5 percent, and four percent in succeeding years in order
deral spending. Under similar logic, the annual federal could be
five percent.

cond drawback to the inclusion of Medicaid eligibles is that they
avor as patients both because states typically pay low fees for
rendered and because other characteristics make them less
patients. Physicians complain that they have a greater tendency
atients to miss appointments, to bring to the office other members
y besides the patient, and to be non-compliant with therapeutic
ong other things (Davidson, 1982). The impact of some of these
ics, however, may be reduced in rural areas where the society is
eous.

er, these two drawbacks will limit the practical utility of
dicaid patients with Medicare patients in an effort to increase
ol.

ng the National Health Service Corps

st direct method of reducing the shortage of primary care
n HMSAs (and, thus, increasing the access of Medicare eligibles to

services) is to hire physicians who will agree to move to underserved areas and practice there. That is the principle of the National Health Service Corps (NHSC), which, by placing physicians and other health care personnel in HMSAs, improved access to care in an area.

Doing so would require reviving a method for selecting physicians and assigning them to HMSAs, as well as funds for paying them a salary and, in many cases, establishing an office for them to practice in. The costs of these functions can be calculated on the basis of estimates, and comparisons can be made with estimates of the cost of the five percent bonus policy. The function of designating areas eligible to receive such personnel is already being performed by the Bureau of Health Professions and need not change (although, depending on the volume, it may expand in size).

The NHSC was able to attract personnel to practice in underserved areas in part because their service was considered to be payment for federal educational loans that enabled them to become physicians, nurses, etc. Since the scholarship program has ended, paying off the loans through service would no longer be an inducement to young health care providers to work in such areas. An important question is the extent to which they would be attracted to those locales anyway. To what extent would young physicians, many of whom have borrowed considerable sums to finance their educations, be willing to practice in such areas? They would earn less than in other settings and would not be building a durable practice (unless, of course, they decided to remain in the area following their tour of duty.) Moreover, they would have a pressing obligation to repay their loans and might believe they could not afford to serve in HMSAs. While these conditions do, in fact, prevail and would, to some degree at least, deter physicians from practicing in HMSAs, a countervailing force is that the competition among practicing physicians is keener than ever before, it is harder to find desirable positions (because there are fewer of them), and starting incomes in other settings appear to be declining (or at least not increasing as other incomes are). In other words, the competitive situation is such that two years of service as a young primary

care physician in a HMSA may be more attractive now than it was in previous years even without the promise of loan forgiveness as an inducement. At least it may cause young physicians to consider a reasonable offer and, thus, gives public officials an opportunity.

The extent to which reviving the NHSC is an exciting prospect for some is, ultimately, an empirical question. Predictions can be made on the basis of interviews with potential medical school graduates and house officers.

4.3.3 Increasing Medicare Fees for Primary Care Services

We can legitimately speculate that a large amount of physician care in rural areas is provided by the primary care specialties (e.g., general and family practice, internists, etc.). This care would include office visits and other non-surgical treatments. Increasing Medicare reimbursement for these services would accomplish two purposes: 1) it may improve access to care by boosting the revenues of primary care physicians practicing in shortage areas and thus provide an incentive for the physician to remain in an underserved area; and 2) it would encourage more medical school graduates to enter the primary care specialties leading to a greater diffusion of physicians to underserved areas. In fact, increasing the reimbursement to primary care physicians for office visits over other technical procedures is a potential by product of the resource based relative value scale (RBRVS) which is favored by some policy makers to replace Medicare's current physician reimbursement system.

5.0 SUMMARY AND RECOMMENDATIONS

5.1 Summary

The policy to pay a bonus to physicians for services provided to Medicare enrollees rests on several assumptions. Logically, the first is that Medicare enrollees in physician shortage areas have a problem with access to necessary services. While the assumption has not yet been tested, it would be possible to do so by calculating utilization rates for Medicare enrollees in shortage areas with those in non-shortage areas and comparing them to each other and to an independent standard. If it turned out that utilization rates were lower in shortage areas, then the shortage-area rate could be compared to the rate in an efficient HMO. If it turned out to be lower than that rate, then, the assumption would be justified that, in fact, there is an access problem in shortage areas.

The policy rests, secondly, on the assumption that the access problem in physician shortage areas, assuming it exists, is attributable to having too few physicians in the area. This is harder to test than the prior assumption since the areas with access problems would, by definition, have shortages of physicians and those without an access problem would not have shortages presumably. Multivariate statistical analyses with data on independent variables representing competing hypotheses (e.g., number of physicians, number of hospital beds, per capita income, percent uninsured, etc.) would permit a test of this assumption, however.

Two additional assumptions relate to physician responses to financial incentives. It has been demonstrated that physicians are, indeed, responsive to the incentives implicit in higher fees; and, therefore, it is reasonable to adopt a policy of paying higher prices (through a 5% bonus payment) in order to influence physicians to provide services to Medicare enrollees in shortage areas. The questions relate to the effects of the magnitude of the bonus: Is five percent of Medicare allowable charges enough to influence physician

behavior? If so, what behaviors would it affect? Would it lead a physician to move to a shortage area? Would it lead him to open a part-time office in a shortage area? Would it make it possible for physicians to remain who was already practicing there but who was having trouble making ends meet? On the basis of available literature, we believe the five percent incentive is too small to attract physicians to a shortage area, but it may make it possible for financially marginal practitioners to remain. We are unable to predict what level of bonus payment would attract physicians to a new area, but we can say it would need to compensate them (over a reasonable time) for the costs of establishing a practice. In the case of young physicians, it would also need to offer the opportunity to repay the often considerable debts incurred during their education and training. Finally, in the case of low-income urban shortage areas, it would need to compensate physicians for costs association with low-paying Medicaid or uninsured patients, the lack of safety and the presence of crime and other factors.

The final assumptions on which the bonus policy are based relate to implementation and feasibility issues: The policy can certainly be implemented (and, in fact, was introduced to rural HMSAs in January). We identified a number of difficulties in implementing it, particularly in urban areas, which indicate that the process is not costless and raises questions as to the feasibility in cities. One issue that arises as a result is how the costs associated with the policy -- the value of the bonuses to be paid and the cost of implementation -- compare to the benefits. These figures can be estimated as well.

5.2 Unanswered Questions and Additional Research

Many of the important questions that remain about the policy and the assumptions it rests on can be answered through additional research, some of which we are in a unique position to perform at the Center for Health Economics Research. For example, we could conduct an empirical test of the relationship between the costs of practice and the allowable charges paid to

physicians in shortage areas and in non-shortage areas. In doing so, we can make use of the Geographic Medicare Economic Index (GMEI), which we have already calculated for market areas in the ten states of which we have 100 percent of Medicare claims. Since we also know the allowable charges for those market areas, it would be possible to compare the costs of practice in each with the allowable charges in each to see if rural physicians and physicians in shortage areas are, in fact, being underpaid relative to other physicians for the Medicare services they provide.

A second analysis we can undertake would be to compare the ratio of physicians who treat Medicare enrollees (primarily, internists, family and general practitioners) to Medicare eligibles in rural and urban shortage areas. By excluding pediatricians and obstetricians, on the one hand, and non-elderly residents, on the other, we could determine the extent to which HMSAs, as defined by the Bureau of Health Professions for the general population, are appropriate for use by HCFA for implementation of the five percent Medicare bonus payment.

A third study which can be performed using our unique ten-state data base of 100 percent of Medicare claims would demonstrate the extent to which utilization rates of Medicare enrollees in physician shortage areas are lower than those in non-shortage areas. Then, by comparing those rates with the rates in an efficient, closed-panel HMO, as a suitable standard, we could demonstrate the extent to which those rates represent underutilization. Finally, it would be possible to review medical records for samples of patients with several common diagnoses in shortage and non-shortage areas. These records, which would include patient-specific outcomes, would permit us to determine the extent to which those in shortage areas are being undertreated or, conversely, the extent to which those in non-shortage areas are receiving more services than are necessary to produce the outcome.

A fourth analysis which can be conducted would estimate the cost of implementation of the policy in rural and urban areas. This would include any costs for the increment in services contemplated under the new bonus policy. The latter could be determined by calculating Medicare payments to physicians practicing in HMSAs in the ten states for which we have several years of

of claims. Those results could then be adjusted with estimates of
.on increases attributable to the bonus, 2) physicians who would
ıctice or expand their activities in those service areas, and
ıts to fees due to inflation and the introduction of RBRVS.
could estimate changes in utilization following adoption of the
: and other payment rates (e.g., a ten percent bonus, twenty
c.) Conducting this study would permit us to determine the cost of
he estimated gains in access.

ly, we could conduct analyses related to the implementation of the
rban areas. These analyses would calculate the costs and estimats
.s of alternative strategies to the five percent bonus to physicians
ervices to Medicare eligibles in shortage areas. In particular, we
rze the effects two alternative strategies: 1) a five percent bonus
:s to Medicaid physicians in addition to the Medicare bonus (in
ncrease the incremental pool of funds and the resulting likelihood
cians would respond to the incentives); and 2) reviving the National
vice Corps in order to place physicians in underserved areas,
ly in those in cities, where implementation of the bonus would be so
difficult than in rural shortage areas.

clusion

:his report, we have examined issues associated with the
ation of a policy to pay a five percent bonus to physicians providing
to Medicare enrollees in shortage areas. In the process, we have
d a number of questions that can be answered with further analysis,
most cases, the Center for Health Economics Research is uniquely
: to perform. The results of these additional studies would be, on
and, more precise estimates of the effects of the new policy and, on
:, detailed consideration of alternative policies that may prove to be
s expensive and more effective in addressing access problems of
enrollees, especially in urban areas.

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